DOCUMENT RESUME

ED 139 128 EC 100 668

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TITLE Evaluation of a Learning Disabilities Kindergarten.
PUB DATE [76]
NOTE 58p.

EDRS PRICE MF-$0.83 HC-$3.50 Plus Postage.
DESCRIPTORS Intervention; Kindergarten; *Learning Disabilities; Primary Education; *Program Effectiveness; Regular Class Placement; *Special Classes

ABSTRACT

Compared was the academic performance in the third grade of 75 children who had participated in the Complete Communication Development Program, a learning disabilities kindergarten, with the performance of 75 children in regular kindergartens. Stanford Achievement Test scores indicated that the Ss in the special class performed significantly lower on reading and mathematics measures than did Ss in regular classes. Results suggested the need for reevaluating the program. (CL)

TITLE: EVALUATION OF A LEARNING DISABILITIES KINDERGARTEN

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This research project evaluates one school district's approach to identify, diagnose, and remediate kindergarten children with learning disabilities. The chief concern of the investigators was to determine whether or not this attempt at early intervention is working. The investigators studied the differences over a three-year period in the reading and mathematics achievement test scores of those kindergarten children identified as having a learning disability requiring placement in a special one-year program from those of kindergarten children remaining in regular classrooms. The data for this study included grade equivalent scores earned on standardized third-grade achievement tests of the 150 students involved in this investigation. A *t*-test for independent samples was employed in the statistical analysis of the data. The data analysis showed the reading and mathematics scores of the children identified as having a learning disability are significantly different from those scores obtained by the control-group children. Referring to the mean reading and mathematics scores, it can be stated that the children identified as having a learning disability scored significantly lower than the control-group children in reading and mathematics achievement. Based on the results of this study, the investigators must conclude that this attempt at early intervention does not provide children with possible learning problems a better chance at successful school achievement in later school years.

## INTRODUCTION TO THE PROBLEM

In 1969, a school community implemented an experimental learning disabilities kindergarten program entitled, "Complete Communication Development Program." The intent of this program was to "eliminate learning disabilities on the kindergarten level" (Complete Communication Development Program, 1969, p. 10). Since the beginning of the program, there has been no analysis of the available data to evaluate the effectiveness of this learning disabilities program.

### Nature of the Problem

A great deal of time, energy and funds have been spent on the Complete Communication Development Program (CCDP) since its implementation in 1969. The aim of the program is to provide kindergarten children with learning disabilities opportunity to alleviate those deficits which might hinder adjustment and learning throughout their school years.

Those who have been involved with the program are now asking questions relating to the achievement of the program's objectives. Parents and teachers have expressed satisfaction with having participated in the program, however, there is no evidence to indicate whether or not participation in the learning disabilities kindergarten program affects the participants' adjustment and learning in later school years.

## Purpose of the Study

The purpose of this study was to determine whether the CCDP has been successful in providing kindergarten children with learning disabilities a better chance at successful school achievement in later years. In this study the academic performance of those children who participated in the learning disabilities kindergarten was compared with that of children who were in regular olassrooms. The criterion variables with which this investigation was concerned were reading and mathematics achievement.

## Hypotheses

The null hypotheses which were tested are:

1. At the third-grade level, reading achievement scores of CCDP children are not significantly different from those of children in the control group.
2. At the third-grade level, the mathematics achievement scores of CCDP children are not significantly different from those of children in the control group.

## Definition of Terms

The theoretical and operational definitions of key terms used in this study were taken directly from the CCDP manual (Complete Communication Development Program, 1969) developed in the school district involved. The following terms were used in this study:

1. Complete Communication Development Program (CCDP). A program established by a school district "in order to eliminate [sic] learning disabilities on the kindergarten level" (Complete Communication Development Program, 1969, p. 10).

2. Learning Disabilities. Refers to one or more significant deficits in the essential learning processes that require special education techniques for its remediation (Lerner, 1971, p. 299). A child with learning disabilities has:

> . . . an IQ of 80 or above and exhibits a disorder in one or more of the basic psychological processes involved in understanding or in using spoken or written language. These [processes] may be manifested in disorders of listening, thinking, reading, writing, spelling, or arithmetic. They include conditions which have been referred to as perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia, developmental aphasia, etc. They do not include learning problems which are due primarily to visual, hearing, or motor handicaps, to mental retardation, emotional disturbances or to environmental disadvantage (Complete Communication Development Program, 1969, p. 10).

3. Reading Achievement. The demonstrated understanding of printed language ranging in length from single words to paragraphs of several sentences and involving levels of comprehension varying from simple recognition to the making of inferences from several related sentences. This variable was measured by the

Stanford Achievement Test, Primary II Battery, Form Y, 1965 Edition and the Primary Level III, Form A, 1972 Revision.

4. Mathematics Achievement. The demonstrated understanding of place value, operational terms, measurement, fractions and the interrelationship of addition and multiplication and their inverses, subtraction and division. This variable was measured by the Stanford Achievement Test, Primary II Battery, Form Y, 1965 Edition and the Primary Level III, Form A, 1972 Revision.

5. Project Staff. A team of professionals organized to operate the CCDP. The staff included the following members: assistant superintendent, visual-motor therapist, motor facilitation therapist, auditory-vocal therapist, social worker, two psychologists, two school nurses, and an optometrist.

6. Screening Procedure. The initial phase of the program designed and operated by the project staff to locate and identify children who may have possible learning problems. The testing instruments used were: pure tone audiometric hearing test (Beltone audiometer), visual test (Titmus vision machine), a medical ocular skills evaluation, Ammons and Ammons Quick Test, Bryngelson Articulation Test, Kephart's Motor Skill Survey, Marianne Frostig Developmental Test of Visual Perception.

7. Diagnostic Procedure. The succeeding phase of the

program designed by the project staff to diagnose mental, perceptual, and/or cognitive factors through the use of tests on those children who indicate possible learning problems in the soreening procedures. The following diagnostic measures were used: Otis-Lennon Intelligence Test, Illinois Test of Psycholinguistic Abilities, Wepman's Sound Discrimination Test, and Vineland Social Maturity Scale.

## Assumptions

A primary assumption of this study was that the educational environment was a critical variable in the shaping of cognitive and affective growth. Therefore, the type of educational environment and the nature of the child's experiences within it would have been highly influential in determining the quality and level of his development.

Another assumption of this study was that all tests were properly administered and scored as well as being reliable and valid instruments. It was also assumed that each child involved in the learning disabilities kindergarten was accurately identified as having a learning disability.

## Limitations

The following limitations were inherent in this investigation:

1. In design this study was an ex post facto experiment. The investigator did not have direct control of the independent variables due to the fact that their manifestations had already occurred (Kerlinger, 1973, p. 379).

2. The learning disabilities sample (Group 1) was biased in that the investigator selected only those kindergarten children who were identified as having learning disabilities and were present in the school district for the four-year period (1969-1972) which extended from kindergarten through third grade. The control sample (Group 11) was also biased in that subjects were randomly selected from those children who entered kindergarten and remained in the school district for the four-year period (1969-1972) which extended from kindergarten through third grade.
3. This study was concerned with only one suburban school district.
4. Language development was not assessed in the screening procedures. The screening measures (pure tone audiometric hearing test, visual test medical ocular skills evaluation, Ammons and Ammons Quick Test, Bryngelson Articulation Test, Kephart's Motor Skill Survey, and the Marianne Frostig Developmental Test of Visual Perception) were heavily biased in the area of visual-motor development.
5. At the time of this writing the definition of learning disabilities used by this school district is not in general agreement with the definitions used by most professional personnel in the field of

learning disabilities. The school district in this investigation included a quantitative limit (80 IQ) for intellectual capacity in its definition. The definition proposed by the National Advisory Committee of Handicapped Children of the U.S. Office of Education (1968) does not include any such demarcations; and, for their purposes, Johnson and Myklebust (1967) considered an IQ of 90 or above to be an adequate quantitative limit.

6. The sample in this study may have consisted of false positives (i.e., children who failed the screening tests who had no evidence of a learning disability) or false negatives (i.e., children who passed the screening tests who had a learning disability). No allowances were made in the program for either of these possibilities.

7. Another variable that might have affected the sample is maturational lag.

> Proponents of the maturational-lag viewpoint hypothesize that children with learning disorders are not so different from children without them. It is more a matter of timing than an actual difference in abilities. They assume a temporary developmental lag in the maturation of certain skills and abilities (Lerner, 1971, p. 240).

8. This study was limited to reading and mathematics achievement in the third grade.

9. This study was limited to reading achievement as indicated by a composite score of the following subtests: reading comprehension, word study skills, word meaning, and paragraph meaning.
10. This study was limited to mathematics achievement as indicated by a composite score of the following subtests: mathematics concepts, mathematics computation, and mathematics applications.

## Importance of the Study

The U.S. Department of Health, Education and Welfare has pointed out that a great deal of experimentation and research still remains to be done, particularly longitudinal studies, with respect to the future effects of the different kinds of programs and their relationships to later accomplishments (Gore & Koury, 1964, p. 4).

Since children who had participated in the learning disabilities kindergarten (CCDP) entered the first grade along with children who had not participated in the learning disabilities kindergarten, it was possible through a program of testing to acquire information to ascertain whether or not the CCDP was effective with children who were identified as having deficits which might have hindered adjustment and learning in their school careers. The following research was undertaken to determine whether one learning disabilities kindergarten program was successful in providing children with learning disabilities a better chance at successful school achievement.

## REVIEW OF RELATED LITERATURE

Professional literature indicates the vital importance of early childhood years and their critical effect on the child's later development (Haring & Ridgway, 1967; Jens, 1970; Project Child, 1972; Project Genesis, 1968; Rubin & Balow, 1971). Bloom (1964) confirms the importance of early childhood programs. His research demonstrates that the typical child attains approximately 50 per cent of his/her ultimate intellectual ability by the age of four. Another 30 per cent increase in intellectual ability is believed to be attained between the ages of four and eight.

While the most strategic age for intervention has not been conclusively determined, there seems to be agreement that the earlier the handicapped child is identified and provided with a remedial program, the better the chances are for actualizing the potential (Karnes, 1973, p. 63). "Special education experts believe that more than 50 per cent of handicapped children can have their condition alleviated if medical and special education services can be provided during the earliest formative period when children are most responsive to treatment" (Project Child, 1972, p. 65).

The need for early identification of children with learning problems has received support in medical, psychological, and educational literature (Caldwell, 1973; deHirsch, Jansky, & Langford, 1966;

Eaves, Kendall, & Crichton, 1974; Karnes, 1973; Keogh & Becker, 1973). Early identification is not only needed but in some states it is now mandatory to screen all kindergarten entrants in order to identify the high-risk children (Badian & Serwer, 1975, p. 283). In 1975, President Ford signed Public Law 94-142 (Stowell, 1976). According to this law, by September, 1978, free public education will be provided for all handicapped children from ages three to eighteen. This law mandates that each state is responsible for special education in both regular classes and in residential settings.

In Illinois, House Bills 322 and 323 were passed in 1971. In House Bill 322 children with learning disabilities are recognized as a separate classification in special education eligible for services. In this bill it is stated that children with learning disabilities are to be accepted into school programs at the age of three. The intention of House Bill 323 is to provide special education services to an identifiable group of handicapped children between the ages of three and five who are not served in public schools. These bills became law July 1, 1972 (Early Childhood Intervention in Illinois, 1974 p. 2).

Research on early identification generally dates back to the middle sixties when the federal government made funds available to initiate early intervention programs (Karnes, 1973, p. 48). In Illinois alone (excluding Chicago), during the school fiscal years 1969 to 1971, there was approximately a 48 per cent increase in the number of learning disabilities classes in which 33,368 children (approximately) were serviced (Special Education: Handicapped

Children's Section, July 1, 1969 to June 30, 1970; July 1, 1970 to June 30, 1971; July 1, 1971 to June 30, 1972).

Such proliferation in the field of learning disabilities is overwhelming, particularly since "learning disability as it is understood today is of relatively recent origin" (Cruickshank, 1972, p. 380). Because of the rapid growth of this field in the last decade, there are many reasons for the numerous problems which exist today in the area of learning disabilities. This field is seen as complex and confused in both definition and programs.

The area of learning disabilities has an overabundance of terminology. In the literature there are more than forty different terms which are used as synonyms for the concept of learning disabilities. Examples of such terms which, essentially, mean the same thing are: central processing dysfunction, special learning disorder, perceptually handicapped, minimal cerebral dysfunction, minimal brain damage, neurologically impaired, and neurologically handicapped. All of these terms have had much in common, but what was needed was one term which had national recognition (Perkins, 1976). Thus, the National Advisory Committee on Handicapped Children of the U.S. Office of Education proposed a definition which was used in the Congressional bill entitled "The Learning Disabilities Act of 1969." This definition is as follows:

> Children with special learning disabilities exhibit a disorder in one or more of the basic psychological processes involved in understanding or in using spoken or written language. These [processes] may be manifested in disorders of listening, thinking, talking, reading, writing, spelling, or arithmetic. They include

> conditions which have been referred to as perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia, developmental aphasia, etc. They do not include learning problems which are due primarily to visual, hearing, or motor handicaps, to mental retardation, emotional disturbance, or to environmental disadvantage (National Advisory Committee on Handicapped Children, 1968, p. 14).

Among experts (Hammill, 1975; Keogh, 1975; Kirk, 1975; McGlannan, 1975; Perkins, 1976) there are considerable differences of opinion on what constitutes a learning disability, what causes it, and how it is to be identified or treated. Concurrenoe in the field comes only in the aoceptance of what learning disabilities are not. They are not due "to visual, hearing or motor handicaps, to mental retardation, emotional disturbance or to environmental disadvantage" (Divoky, 1975, p. 317). While trying to define the problem the definers generally resort to statements of inclusion and exclusion. The failure to produce a reasonably clear-cut definition for learning disabilities should be minimized when less inclusive terms and more refined conoepts are used (Cruickshank, 1972, p. 383).

The lack of an explioit definition for learning disabilities has led to diverse state guidelines and local school policies in the identification and educational procedures of the learning disabled child. As a result, the responsibility of educating the learning disabled child has led to a wide variety of educational programs.

Learning disabilities programs which specifically involve kindergarten ohildren focus on such areas as: (1) special measuring devices used for screening (identification); (2) diagnosing areas of deficit

(diagnosis); (3) special programming for the learning disabled child (remediation); and (4) evaluative measures (evaluation).

## Identification

A number of researchers (Haring & Ridgway, 1967; Hartlage & Lucas, 1973; Hoffman, 1971; Keogh & Smith, 1970; University City School District, 1970; Walker, 1971; Wilborn & Smith, 1974) have attempted to identify those children who early in their school career show signs of learning difficulties. There have been many different efforts to predict potential learning problems in early school-age children. Some researchers (Keogh, Tchir, & Windeguth-Behn, 1974; Feshback, Adelman, & Fuller, 1974; Uyeda, 1972) based their studies on the kindergarten teacher's predictive ability to detect learning disabilities in children. In a recent study, Cowgill, Friedland, and Shapiro (1973) attempted to determine whether learning disabilities can be predicted from kindergarten teachers' anecdotal reports. Thirty-seven boys diagnosed as learning disabled, were selected for one group of subjects and control group was chosen from the same kindergarten classes. Judges rated the teacher reports on these boys with two types of measures. The two groups differed significantly on all scales of general behavior and in all but one of the trait categories. The findings of their study imply that learning disabilities can be predicted both by the teacher's general impressions about a child and by specific traits which characterize particular behavior.

Still other researchers (Badian & Serwer, 1975; Book, 1974; Bradley, 1975; Eaves, Kendall, & Crichton, 1972, 1974; Planz, 1972; Satz & Friel, 1972, 1974) have relied on batteries of tests

devised specifically for identification of kindergarten children with potential problems. Thomson (1974) reports on a program designed to locate children with learning deficits during their first month in kindergaeten and to initiate intervention to counteract those deficits. The initial screening was comprised of an evaluation of auditory memory, visual memory, language comprehension, and visual motor perception. Those children who demonstrated weaknesses in several areas went through a second screening which included modified IQ tests and observation of neurological development. At the conclusion of the testing, 18 of the 200 tested were selected for the program, and 18 others were designated as the controls. Two years later, in a retest of the 200 originally involved, it was found that the testing procedures had been highly successful in predicting accurately those children who did have learning disabilities.

## Diagnosis

One tenet of the learning disabilities movement is that "lags or deficits in perceptual development have frequently been related to school learning problems in the research and writings of many concerned professionals" (Slater, 1971-72, p. 149). A number of programs (Paddlino, 1971a, 1971b; Reece, 1966; Slater, 1971-72; Union Township Board of Education, 1968)have emerged with complete diagnosis and remediation plans for kindergarten children showing deficiencies in the area of perceptual development.

Klesius (1971) reported on the research of perceptual-motor development programs and the programs' effect on reading achievement. He selected eleven studies which met the following criteria: minimum

sample size of forty subjects, an experimental period of at least eighteen weeks and a pretest-posttest research design with experimental and control groups. The studies were divided into those which supported the hypothesis that perceptual-motor development enhances reading achievement and those studies which did not support this view. Klesius concluded that the hypothesis can neither be confirmed nor denied on the basis of the studies reviewed. These findings seem to indicate that programs which utilize only the perceptual-motor approach to remediate deficits can not be assumed to be a general panacea for learning disabilities.

## Remediation

Remediation for children with learning problems has proven to be a forward step in meeting the individual needs of children in special learning disabilities programs. However, emphases within the remediation process of learning disabilities programs are numerous and varied. For example, in the Galena Park Public School Program (McGahan, 1967) specialized equipment and instructional aids are provided to present the best possible learning situations. The specialized equipment used in this program consists of: classrooms equipped with standardized equipment for special education classes, e.g., isolation screens and portable booths. The instruotional aids used are materials that lend themselves to a multi-sensory approach and aids that lend themselves to teaching in depth, such as form perception boards, educational puzzles, art and craft materials, tracing paper, and record players.

Another attempt to provide appropriate remediation for the

learning disabled child is illustrated in the Penfield Central School District (Goldstein & Coleman, 1969). In this project an elementary guidance counselor and a pediatrician were added to the staff of the pupil personnel team of an elementary school. It was stated that later certain trends became evident due to these additions to the school staff: (1) teachers became sensitized to early identification of student problems; (2) the pediatrician had a valuable contribution to make, such as aiding the teacher in the understanding of children; (3) a full-time elementary guidance counselor helped coordinate the personnel team and added to the teacher's sensitivity of pupil problems.

The use of grouping based on academic achievement in kindergarten is still another approach used as a remediation technique. In the School District of Jennings, Missouri (McGilligan, 1970), it was hypothesized that grouping children according to developmental lag would be beneficial to the subjects in terms of their academic development. "The study suggests that the practice of grouping in kindergarten may be beneficial and presumably instrumental in preventing learning disabilities, but it was not without its short comings" (McGilligan, 1970, p. 22).

Although none of the described remedial plans was a cure-all for every child with learning problems, many suggestions regarding materials and methods used by teachers working with learning disabled children were made.

## Evaluation

A number of projects (Barnard, 1970; Fargo, 1968; Jens, 1970; Makolin, 1972) with a complete program of identification, remediation,

and evaluation for kindergarten children with learning disabilities have emerged. However, the measures used to evaluate these projects are as diverse as the program themselves.

Some research reports do not include objective measurements to verify the effectiveness of the identification and remediation procedures used in the programs studied. For example, a three-year program for early identification and remediation of learning disabilities at the kindergarten level was reported by Padalino (1971). Although graphs indicating improvement in deficit areas were presented, the effectiveness of the program was evaluated by written statements of teachers, specialists, and administrators. No objective measures were used, therefore, the results of this type of study should be interpreted with caution.

The validity of the results of some studies (Hayes & Dembo, 1970; Kennedy, 1969; Shipe & Miezitis, 1969) is questionable because of sample size. An example of such a study is the one focused upon the Rhode Island Program (Weiner, 1973). All entering kindergartners were screened in order to identify those children who displayed developmental learning delays. Those children who were identified as high risk were placed in a special class. This program consisted of combining a solid early childhood education program for first-grade readiness with emphasis on special education techniques for remediating learning disabilities. Statistical analysis of the data showed that sixty-two per cent of the children involved moved from a high-risk level for success in kindergarten to a low-risk level for failure in first grade. It should be noted, however, that the

sample size was only thirteen and reliance upon statistical analysis with too few subjects can be misleading.

## Summary

The problems in the field of learning disabilities stem from the fact that the profession is at a comparatively early stage in American education. "The extraordinary growth of the field is an indication that there was a real need for recognition of the therapeutic programs for a number of children for whom there was no recognized place nor help" (Keogh, 1975, p. 323). In the past decade, services for the learning disabled child increased in terms of the number of children served, the number of professionals employed, and the number of programs implemented. Those who have been involved in and are committed to early identification and remediation of the learning disabled child believe that the learning disabled child could function at a higher level if appropriate intervention were provided in the early years.

The problems and controversies which have plagued the field should be reduced as time and opportunity allow professionals in the field to gather the necessary child and program information. In the present study an attempt was made to contribute such information concerned with early identification and remediation of the learning disabled child.

## METHODOLOGY

As stated earlier, the Complete Communication Development Program (CCDP) has been in existence for six years. Since the beginning of the program, there has been no analysis of the available data to evaluate the effectiveness of this learning disabilities program. The purpose of the present investigation was to determine whether the CCDP was successful in providing kindergarten children with learning disabilities a better chance at successful school achievement in later years.

### Setting of the Study

The geographical area involved in the study was a southern suburb of Chicago. The population at the beginning of the program (1969) was 13,200, including all racial and religious backgrounds (Complete Communication Development Program, 1969, p. 12). The socioeconomic status of the population in this study consisted of blue-collar workers with an average educational level of a high-school degree earning an annual income between $12,000-$16,000 (Stark, 1976).

The village is a middle-class residential community of small homes and low apartment buildings with only a few factories. Most of its working population have found employment outside the village (Illinois: Guide and Gazetteer, 1969, p. 99).

## Description and Selection of the Sample

The school district contained a total of five elementary schools, two public schools and three parochial schools. The sample in this study was selected from the total population of students in the public schools that enrolled in kindergarten during the years 1969-1972 and have remained in the school district for the four-year period extending from kindergarten through third grade.

After permission was granted from the State Superintendent of Schools for access to student files (Appendix A and Appendix B), the sample size was dependent on: the number of children screened at kindergarten who were still in the district, and completeness of the recorded information in the children's cumulative folders.

For this study each kindergarten class of children was divided into two groups. One group was comprised of children who participated in the learning disabilities program and was considered the experimental group. The second group was randomly selected from those children who entered the regular kindergarten and was designated as the control group, comparable in number to the experimental group.

An average of thirty-two children participated in the learning disabilities kindergarten each year (Thomas, 1975). The population of this school district was rather mobile. This mobility caused a loss of subjects for the four-year follow-up. Approximately 59 per cent of the kindergarten population participated in this investigation.

## Description of the Complete Communication Development Program

The CCDP was established by a school district "in order to

eliminate [sic] learning disabilities on the kindergarten level" (Complete Communication Development Program, 1969, p. 10). The school district proposed to carry out an efficient learning disabilities program by including any kindergarten child residing in the school district who has an I.Q. of 80 or above and exhibits:

> . . . a disorder in one or more of the basic psychological processes involved in understanding or in using spoken or written language. These [processes] may be manifested in disorders of listening, thinking, talking, reading, writing, spelling or arithmetic. They include conditions which have been referred to as perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia, developmental aphasia, etc. They do not include learning problems which are due primarily to visual, hearing, or motor handicaps, to mental retardation, emotional disturbances or to environmental disadvantage (Complete Communication Development Program, 1969, p. 10).

The Complete Communication Development Program included:

1. a screening program for all kindergarten children.
2. a complete diagnostic evaluation for all candidates for the learning disabilities classroom.
3. the establishment of a learning disabilities classroom with a specialized curriculum geared to the individual child's needs.
4. individual therapy for the children in the learning disabilities classroom.
5. a continuous follow-up (Help-Phase Program) for first grade.
6. parental and community involvement (Complete Communication Development Program, 1969, p. 10).

## Screening Procedure

The soreening program began in the summer of 1969, approximately two and one-half weeks before the beginning of the school year. The parents of all children enrolled in the kindergarten classes were informed by letter of a pre-school soreening program organized to locate those children who may have had a possible learning problem. Forty children were screened per day by a team consisting of the project staff, a community optometrist, school nurses, and parent volunteers.

The first phase of the screening procedure consisted of the following five screening stations: Screening Station 1--Vision and Hearing Tests; Screening Station 2--Ocular Muscle Development; Screening Station 3--Auditory-Vocal Language Assessment; Screening Station 4--Articulation Test; and Screening Station 5--Motor Facilitation Test. The screening instruments used were: pure tone audiometric hearing test (Beltone audiometer); visual test (titmus vision machine); a medical ocular skills evaluation; Ammons and Ammons Quick Test; Bryngelson Artioulation Test (Appendix F); and Kephart's Motor Skill Survey (Appendix E). Each child who participated in the preschool screening program rotated from station to station.

Following the first phase of the screening, the children were given an outdoor recess for fifteen minutes under the supervision of the parent volunteers. The children then advanced to the final screening station (6) which was the Marianne Frostig Test of Visual Perception. This test was administered to groups of

seven children (Complete Communication Development Program, 1969, p. 27).

## Diagnostic Procedure

During the first month of the school year, kindergarten children who were identified by the screening measures as having possible learning problems received a full battery of diagnostic tests administered by the project staff. The following diagnostic measures were used: Otis-Lennon Intelligence Test, Illinois Test of Psycholinguistic Abilities (1961), Wepman's Sound Discrimination Test, and Vineland Social Maturity Scale. The test results were used to select those children who were eligible for the learning disabilities program; these children were then tested by the psychologists. The psychologists made the final placement decisions (Complete Communication Development Program, 1969, p. 32).

## Organization and Curriculum of the Learning Disabilities Classroom

The psychologists chose the candidates for the learning disabilities class. By the second month of the school year (1969) the classroom was formed. The learning disabilities classroom provided each child with a curriculum tailored to his/her individual learning needs (Complete Communication Development Program, 1969, p. 37).

The four-faceted curriculum promoted a unique classroom which facilitated total class activities and small group instruction structured to the individual child's needs. After the children participated in total class activities and lessons, they were divided into small groups and rotated from table to table mastering the daily language skills. Each day, the table activities changed in accordance to the children's growth. The daily lesson plans were flexible to meet

the needs of the child as his/her skills improved (Complete Communication Development Program, 1969, p. 48).

The learning disabilities curriculum consisted of four areas: Visual-Motor Curriculum. The purpose of the visual-motor curriculum was to develop visual-motor expression, visual reception, visual-motor integration and visual-memory skills. The material used daily to develop all areas of visual perception were: Peabody Language Development Kit, Level 1, Marianne Frostig Visual Perception, Workbooks 1, 11, and 111 (Complete Communication Development Program, 1969, p. 37).

Auditory-Vocal Curriculum. The purpose of the auditory-vocal curriculum was to develop auditory reception, auditory-vocal integration, vocal expression and auditory memory skills. The curriculum materials which emphasized the auditory-vocal skills were: the daily language arts worksheets, devised by the auditory-vocal therapist, to reinforce all areas of auditory-vocal development; the daily use of the Peabody Language Development Kits, Level 1; beginning phonics units on speech helpers and auditory discrimination which also were devised by the auditory-vocal therapist (Complete Communication Development Program, 1969, p. 40).

Motor and Ocular Curriculum. The purpose of the motor enrichment program was to develop the child's motor repsonse to himself and his surroundings. On a daily basis the motor and ocular therapist worked with the children in the following skills areas: body image, handedness and sidedness, eye-hand coordination, dominance, balance, movements (Complete Communication Development Program, 1969, p. 43).

The purpose of the ocular program was to develop the child's ocular muscles to function adequately. Children who were in need of ocular work were seen by the motor and ocular therapist three times per week in small groups. Activities used were designed to develop the child's ocular skills (Complete Communication Development Program, 1969, p. 45).

Social Curriculum. The purpose of this curriculum was to foster healthy social development and to stress cooperation, the need to share, the productive use of materials, and social behavior. The Peabody Language Development Kit, Level 1 was the material used for the social development area (Complete Communication Development Program, 1969, p. 46).

## Individual Therapy

The children were selected for individual therapy by a staffing of the teacher, social worker, auditory-vocal therapist, visual-motor therapist, and motor and ocular therapist. The recommended children received a minimum of three individual therapy lessons per week each at least one-half hour in duration. Each child had a revolving time schedule for therapy; this schedule alleviated a continual loss of one portion of their classroom curriculum.

Therapy consisted of activities and games which were designed to develop and strengthen the child's learning deficits. When a child showed improvement to his age level, another staffing was held to discuss his possible dismissal from therapy and the selection of another child to replace him in the program. This flexible schedule of intensified therapy enabled the majority of the children

in the learning disabilities classroom to receive individual therapy (Complete Communication Development Program, 1969, p. 51).

## Help-Phase Program

A Help-Phase program was initiated in the first grade to provide: (1) individual therapy for the children who had been in the learning disabilities kindergarten class and needed continued language development; (2) assistance for the first-grade classroom teachers; (3) individual therapy and/or teacher assistance for children who had learning problems and transferred into the school district.

The auditory-vocal therapist and the visual-motor therapist provided individual Help-Phase therapy sessions twice a week for periods of not less than thirty minutes. The number of children seen was determined at a staffing.

The motor therapist, ocular therapist, and social worker had Help-Phase sessions two days a week; the number of children seen was based upon optometric and psychological referrals (Complete Communication Development Program, 1969, p. 53).

## Parental and Community Involvement

Parental and community involvement was an objective of the project. The following procedures were initiated:

1. At three yearly P.T.A. meetings the project staff presented discussions of the learning disabilities program. The September meeting was an introduction to the program. The mid-year and end-of-the-year meetings consisted of progress reports and demonstrations.

2. The project staff organized and trained parent volunteers to assist in the: pre-school screening program, daily motor and ocular skills instruction, and special learning experiences in the first-grade classroom.

3. The project staff gave presentations of the program to various civic organizations.

4. The program included community services such as optometric evaluations.

5. All parents of the enrolled kindergarten children in the public and parochial schools were notified and introduced to the pre-school screening program (Complete Communication Development Program, 1969, p. 56).

In addition to the above exposure and involvement, parents of the children placed in the learning disabilities program were given the following special attention:

1. Prior to class placement in the learning disabilities classroom, the children's parents participated in a detailed afternoon seminar which disclosed the objectives and procedures of the project. The seminar commenced with individual parent conferences. A project staff member discussed the child's learning deficits and explained how the curriculum helped their child develop communication skills necessary for academic learning.

2. At mid-year and the end-of-the-year, individual parent conferences were held to discuss the child's

progress and the child's report card.

3. The classroom teacher sent a monthly newsletter informing the parents of the specialized classroom activities (Complete Communication Development Program, 1969, p. 57).

## Instrumentation

The Stanford Achievement Tests were administered annually at the end of the academic year. The achievement tests were administered by the classroom teacher to the whole group simultaneously. The tests were administered according to the directions in the test manual and scored by the classroom teachers. The variables tested were reading and mathematics achievement.

Reading achievement was defined as the demonstrated understanding of printed language ranging in length from single words to paragraphs of several sentences and involving levels of comprehension varying from simple recognition to the making of inferences. The Stanford Achievement Tests used in this study yielded a composite score of subtests to evaluate reading achievement. The 1969 and 1970 kindergarten groups were measured on this variable by means of the Word Meaning, Paragraph Meaning, and Word Study Skills subtests of the Stanford Achievement Test, Primary II Battery, Form Y, 1965 Edition. The 1971 and 1972 kindergarten groups were measured on this variable by means of the Vocabulary, Reading Comprehension and Word Study Skills subtests of the Stanford Achievement Test, Primary Level III, Form A, 1972 Revision. Both editions of the Stanford Achievement Tests reported the raw scores in terms of grade equivalents.

Mathematics achievement was defined as the demonstrated understanding of place value, operational terms, measurement, fractions and the interrelationship of addition and multiplication and their inverses, subtraction and division. Here, again, it is not possible to isolate mathematics achievement completely since mathematics usually involves several related skills. The Stanford Achievement Tests used in this study yielded a composite score of subtests to evaluate mathematics achievement. In the 1969 and 1970 kindergarten children groups were measured on this variable by the Arithmetic Computation and Arithmetic Concepts subtests of the Stanford Achievement Tests, Primary II Battery, Form Y, 1965 Edition. The 1971 and 1972 kindergarten groups were measured on this variable by means of the Mathematics Concepts and Mathematics Computation subtests of the Stanford Achievement Test, Primary Level III, Form A, 1972 Revision. Both editions of the Stanford Achievement Tests reported the raw scores in terms of grade equivalents.

A conversion table in the Stanford Research Report No. 5 (1973) was used to translate grade equivalents on the 1965 Edition of the Stanford Achievement Test into grade equivalents on the 1972 Edition of the Stanford Achievement Test. Equivalence of scores from the two editions of the Stanford Achievement Test was determined empirically by the administration of both tests to groups of students matched on Otis-Lennon Mental Ability Test Deviation Intelligence Quotients (Stanford Research Report No. 5, 1973).

## Data Collection

Data on each child were summarized on Form A (Appendix C).

An identification number was assigned to each child and was placed on the form so as to avoid duplication or omissions of data during the collection process. This procedure also assured anonymity for all children involved.

## Data Analysis

This study was undertaken in order to determine if there is a significant difference in the reading and mathematics achievement at the third-grade level of those children who participated in the learning disabilities kindergarten and that of children who were in the regular kindergarten classrooms. A t-test for independent samples was used to determine if there is a significant difference between the reading and mathematics scores earned by the two groups of children on the third-grade achievement tests. The grade equivalents (Appendix D) from the Stanford Achievement Tests were used in the analysis. An *a priori* significance level of .05 was established.

## ANALYSIS OF THE DATA

A *t*-test for independent samples was used to test each of the stated hypothesis. The critical value of *t* was determined for each group comparison on the basis of values indicated in a table that provides the value of the Student *t*-Distribution (Glass & Stanley, 1970, p. 521). The critical value of *t* was established *a priori* at the .05 level of significance.

Each of the formulated hypotheses will be restated separately and the analysis of the data relevant to each hypothesis will follow.

$H_1$: At the third-grade level, reading achievement scores of CCDP children are not significantly different from those of children in the control group. A test of the first hypothesis provided the information that is contained in Table 1.

TABLE 1

MEANS, STANDARD DEVIATIONS, AND OBSERVED t-VALUES IN THE COMPARISON OF MEAN READING ACHIEVEMENT SCORES--TOTAL EXPERIMENTAL AND CONTROL GROUPS

| Group | N | $\bar{X}$ | Standard Deviation | Critical *t* (.05) | Observed *t* |
|---|---|---|---|---|---|
| Experimental | 75 | 110.33 | 23.993 | ±1.980 | -4.022 |
| Control | 75 | 127.72 | 29.368 | | |

The results of the analysis of reading scores for the total experimental and control groups indicated that the observed *t*-value

of -4.022 exceeded the critical t-value of ±1.980 at the .05 level of significance. This significant difference necessitated rejection of the null hypothesis. The reading scores of those children who participated in the learning disabilities kindergarten were significantly lower than those of children who were in regular kindergarten classrooms.

$H_2$: At the third-grade level, the mathematics achievement scores of CCDP children are not significantly different from those of children in a control group. Results of the test of the second hypothesis are contained in Table 2.

TABLE 2

MEANS, STANDARD DEVIATIONS, AND OBSERVED t-VALUES IN THE COMPARISON OF MEAN MATHEMATICS SCORES-TOTAL EXPERIMENTAL AND CONTROL GROUPS

| Group | N | $\bar{X}$ | Standard Deviation | Critical t (.05) | Observed t |
|---|---|---|---|---|---|
| Experimental | 75 | 73.60 | 13.311 | ±1.980 | -4.361 |
| Control | 75 | 83.33 | 14.347 | | |

The results of the analysis of mathematics scores for the total experimental and control groups indicated that the observed t-value of -4.361 exceeded the critical t-value of ±1.980 at the .05 level of significance. This significant difference necessitated rejection of the null hypothesis. The mathematics score of those children who participated in the learning disabilities kindergarten were significantly lower than those of children who were in regular kindergarten classrooms.

# SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

## Summary

The Complete Communication Development Program was designed to "eliminate [sic] learning disabilities on the kindergarten level" (Complete Communication Development Program, 1969, p. 10). The chief concern of this investigator was to determine whether or not this attempt at early intervention is working. The investigator studied the differences over a three-year period in the reading and mathematics achievement test scores of those children identified as having a learning disability and placed in a one-year program from those of children remaining in regular classrooms.

The subjects of this investigation were selected from the total population of students who enrolled in kindergarten in the selected public school during the years 1969-1972, and who have remained in this school district during this four-year period. The data for this study included grade equivalent scores earned on standardized third-grade achievement tests. The data were obtained from the cumulative folders of the 150 students involved in this investigation. A t-test for independent samples was employed in the statistical analysis of the data.

In design, this study was an ex post facto experiment. In this type of research the investigator is not able to control or manipulate the independent variables. According to Kerlinger (1964)

education is a fertile field for ex post facto research, because many problems in education do not lend themselves to experimental inquiry. While ex post facto research is practical in the field of education, caution must be exercised when inferring and concluding from this type of investigation.

## Conclusions and Discussion

On the basis of the findings reported previously, the following conclusions have been drawn: (1) At the third-grade level the reading achievement scores of the children who participated in the learning disabilities kindergarten are significantly different from the reading achievement scores of children who were in regular classrooms. This was evidenced by the results of the analysis of data relevant to the first hypothesis formulated for this study. The data analysis showed that the observed $t$ exceeded the critical value of $t$ (.05). The reading scores obtained by the CCDP children are significantly differednt from those scores obtained by the control-group children. Referring to the mean reading achievement scores in Table 1, it can be stated that the CCDP children scored significantly lower than the control-group children in reading achievement.

(2) At the third-grade level the mathematic achievement scores of the children who participated in the learning disabilities kindergarten are significantly different from those scores of children who were in a regular classroom. Here, again, this was evidenced by the results of the analysis of data relevant to the second hypothesis formulated for this study. The data analysis showed the observed $t$

of the mathematics scores exceeded the critical value of $t$ (.05). The mathematics scores of CCDP children are significantly different from those scores obtained by the control-group children. Referring to the mean mathematics scores in Table 2, it can be stated that the CCDP children scored significantly lower than the control-group children in mathematics achievement.

Based on the results of this study the investigator must conclude that the CCDP does not provide children with possible learning problems a better chance at successful school achievement in later school years. These results are contrary to the evidence presented in numerous reports of research relating to learning disabilities programs (Eaves, Kendall & Crichton, 1972, 1974; Haring & Ridgway, 1967; Jens, 1970; Karnes, 1973; Makolin, 1971-72; Padalino, 1971; Project Child, 1972; Project Genesis, 1968; Rubin & Balow, 1971; Slater, 1971-72; Thomson, 1974; Uyeda, 1972; Weiner, 1973). Other research (Barnard, 1970; Bradley, 1975; Cowgill, Freidland & Shapiro, 1973; Fargo, 1968; Hoffman, 1971; Keogh & Smith, 1970; McGilligan, 1970; Satz & Friel, 1972, 1974) tends to support the contention that early intervention alleviates many problems that may be intractable in later years. In view of the present study, the investigator suggests that all parties concerned with the CCDP evaluate every facet of the program: identification, diagnosis, and remediation. The purpose of the program evaluation is not merely to document or confirm deficiencies within the program but rather to provide information which might be used as the basis to implement change within the program. In the design of the program, procedures

for evaluation and change should be incorporated in order to obtain and maintain a successful and effective preventative learning disabilities program. To date, such procedures have not been considered.

## Recommendations

In the course of this study, several questions arose and have generated suggestions for further research. Further investigation regarding the modification of the quantitative limit used in the definition of learning disabilities from 80 IQ to 90 IQ or above might be advisable. Johnson and Myklebust considered an IQ of 90 or above to be an adequate quantitative limit. In some of their studies they included the 80 to 90 IQ group in the learning disability population, and have found that success with this group has been more limited because, though moderate, a degree of mental retardation is present (Johnson & Myklebust, 1967, p. 13).

The findings of this study suggest the need for examination of the screening procedures the school district is using to identify children who may have learning problems. The screening measures used in this investigation were biased in the area of visual-motor development. Every child is a unique individual with varying rates of psychomotor, cognitive, and affective learning patterns (Mardell & Goldenberg, 1972, p. 58). Further investigation of new screening tools that encompass the multi-dimensional learning patterns of children is advisable in the process of identifying children with learning problems.

While this study was limited to two variables of reading and mathematics achievement, the investigator suggests the investigation

of the effects of early intervention on non-intellectual factors. Hopefully, children would manifest behavioral changes that are not measured by ordinary achievement tests. Are there changes in a student's attitudes, attention spans, self-concepts, and self-expectations because of his/her classification in a particular group? To what extent are motivational factors influenced by the learning disabilities classroom?

There is also a need for further investigation of the relationship of the sex variable to learning disabilities and to academic achievement. It might be profitable to institute comparative studies of the academic achievement and non-intellectual factors of boys and girls attending classes segregated by sex, and boys and girls in mixed classes.

The findings of this study also suggest the need for establishing annual evaluative measures. This systematic evaluation would alleviate problems inherent in studies incorporating a longer time period such as rates of teacher and student attrition, incomplete student records, and outdated and/or ineffective screening and diagnostic procedures.

A survey should be conducted to determine whether or not the program is successful in communicating its objectives and procedures to the parents of children involved in the learning disabilities kindergarten. Were the parents of children with learning disabilities made aware of services, agencies, and institutions that could be of help to them?

## Concluding Remarks

Many schools throughout the country have made attempts to locate and to educate the learning disabled child. It must be remembered, however, that the field of learning disabilities is burdened with contradications. Paradoxically, learning disabilities programs that are successful in one school are inadequate in others. Therefore, it is imperative for school administrators and teachers to consider the needs, expectations, and environments of their own specific schools when educating the learning disabled child.

Although no definitive solutions to the problems involving the education of the learning disabled child resulted from this study, the investigator felt that some pertinent questions have been raised for further consideration and that some assumptions regarding the CCDP are not tenable.

# APPENDIX

APPENDIX A

April 23, 1976

Dr. Joseph M. Cronin
State Superintendent of Education
Illinois Office of Education
100 North First Street
Springfield, Illinois 62777

Dear Dr. Cronin:

I should like to request release of information from student records of this District for the purpose of completing a research project on the validity of a program in existence for the past six years. (See enclosure.) The study would be done by two students working on their Masters Degree theses at St. Xavier College and Northeastern University. No student or parent would be able to be identified in the research study -- only information concerning the effectiveness of the program.

Should further information be necessary I shall be happy to comply.

Yours truly,

Milton George

MG:nd
Encl.

APPENDIX A

The Complete Communication Development Program (CCDP) has been in existance for six years. No research has been done on the program to determine if CCDP is an effective program for remediation of learning problems. This study will evaluate the effectiveness of the learning disabilities curriculum and early intervention of children with learning problems. Also, it will present a summary of the data, specifying the performance norms for children in this district.

One of the best arguments for early intervention is that it should eliminate many problems that may be intractable in later years, thus reducing the necessity for placement in special classes or for special services. The CCDP attempts to be a preventive program for many children who appear to need special education. Ideally this learning disabled child will function at a higher level than would be possible without early intervention. This study will clarify if this intervention endeavor is working.

Sandra Corrigan

Sandra Corrigan

Gail F. Gilbert

Gail F. Gilbert

ILLINOIS OFFICE OF EDUCATION
Joseph M. Cronin
State Superintendent of Education
100 North First Street
Springfield, Illinois 62777

regional offices:
160 West Randolph
Chicago, Illinois 60601
2413 Broadway
Mt. Vernon, Illinois 62864

APPENDIX B

May 12, 1976

Ms. Sandra Corrigan
and Gail F. Gilbert
c/o Milton George
Superintendent
Calumet Public Schools
District 132
Calumet Park, Illinois 60643

Dear Ms. Corrigan and Gilbert:

Your request for permission to be granted access to school student records at Calumet school district for the purposes of research, statistical reporting and/or planning is hereby approved.

Please be advised that any information obtained from such records must be maintained in strictest confidence. In addition, any reports released as a result of your project must not contain any information which would permit the identification of any student or parent. For additional information, please find enclosed the Illinois School Student Records Act and the State Board of Education's Regulations on Student Records.

If you have any questions or wish further information, please feel free to contact my office.

Sincerely,

Joseph M. Cronin

Joseph M. Cronin
State Superintendent of Education

Enclosure
cc: Milton George

I.D. no._____ SCHOOL_____

PLACEMENT_____ BIRTHDATE_____

APPENDIX C

| SCREENING | DIAGNOSTIC | POST-TEST |
|---|---|---|
| ate: | date: | date: |
| nons & Ammons: | INTELLIGENCE TEST:_____ SCORE:_____ | ITPA: CA_____ IQ_____ PLA_____ |
| yngelson Articulation: | | |
| phart's Motor Skill: | ITPA: CA_____ IQ_____ PLA_____ | aud rec_____ vis rec_____ vis mem_____ |
| rianne Frostig: | aud rec_____ vis rec_____ vis mem_____ aud asc_____ aud mem_____ vis asc_____ vis clo_____ verb ex_____ gram cl_____ man exp_____ | aud asc_____ aud mem_____ vis asc_____ vis clo_____ verb ex_____ gram cl_____ man exp_____ |
| re tone audiometric: | Wepman's Discrim.: | |
| sual test: | Vineland Social Maturity: | |

| KINDERGARTEN | FIRST GRADE | SECOND GRADE | THIRD GRADE |
|---|---|---|---|
| teacher: | teacher: | teacher: | teacher: |
| AME: | NAME: | NAME: | NAME: |
| ate: | date: | date: | date: |
| read math | read math | read math | read math |
| rs_____ _____ | rs_____ _____ | rs_____ _____ | rs_____ _____ |
| ss_____ _____ | ss_____ _____ | ss_____ _____ | ss_____ _____ |
| % _____ _____ | % _____ _____ | % _____ _____ | % _____ _____ |

APPENDIX D

CONTROL GROUP

MATH

GRADE EQUIVALENT SCORES

| x | $x^2$ | x | $x^2$ | x | $x^2$ |
|---|---|---|---|---|---|
| 70 | 4900 | 73 | 5329 | 100 | 10000 |
| 79 | 6241 | 77 | 5929 | 93 | 8649 |
| 72 | 5184 | 48 | 2304 | 73 | 5329 |
| 71 | 5041 | 86 | 7396 | 94 | 8836 |
| 104 | 10816 | 89 | 7921 | 62 | 3844 |
| 90 | 8100 | 111 | 12321 | 81 | 6561 |
| 86 | 7396 | 89 | 7921 | 82 | 6724 |
| 51 | 2601 | 99 | 9801 | 82 | 6724 |
| 101 | 10201 | 84 | 7056 | 90 | 8100 |
| 85 | 7225 | 88 | 7744 | 83 | 6889 |
| 72 | 5184 | 63 | 3969 | 72 | 5184 |
| 84 | 7056 | 103 | 10609 | 88 | 7744 |
| 93 | 8649 | 104 | 10816 | 63 | 3969 |
| 78 | 6084 | 104 | 10816 | 101 | 10201 |
| 101 | 10201 | 56 | 3136 | 75 | 5625 |
| 75 | 5625 | 106 | 11236 | 81 | 6561 |
| 100 | 10000 | 73 | 5329 | 91 | 8281 |
| 82 | 6724 | 106 | 11236 | 94 | 8836 |
| 77 | 5929 | 83 | 6889 | 100 | 10000 |
| 88 | 7744 | 71 | 5041 | 81 | 6561 |
| 76 | 5776 | 86 | 7396 | 85 | 7225 |
| 66 | 4356 | 71 | 5041 | 102 | 10404 |
| 60 | 3600 | 72 | 5184 | 90 | 8100 |
| 108 | 11664 | 62 | 3844 | 85 | 7225 |
| 92 | 8464 | 62 | 3844 | 75 | 5625 |

APPENDIX D

CONTROL GROUP

READING

GRADE EQUIVALENT SCORES

| $x$ | $x^2$ | $x$ | $x^2$ | $x$ | $x^2$ |
|---|---|---|---|---|---|
| 96 | 9216 | 195 | 38025 | 119 | 14161 |
| 94 | 8836 | 111 | 12321 | 76 | 5776 |
| 195 | 38025 | 144 | 20736 | 106 | 11236 |
| 137 | 18769 | 126 | 15876 | 154 | 23716 |
| 117 | 13689 | 105 | 11025 | 117 | 13689 |
| 106 | 11236 | 163 | 26569 | 105 | 11025 |
| 125 | 15625 | 115 | 13225 | 112 | 12544 |
| 136 | 18496 | 145 | 21025 | 107 | 11449 |
| 143 | 20449 | 171 | 29241 | 114 | 12996 |
| 126 | 15876 | 72 | 5184 | 117 | 13689 |
| 124 | 15376 | 96 | 9216 | 164 | 26896 |
| 92 | 8464 | 120 | 14400 | 174 | 30276 |
| 158 | 24964 | 149 | 22201 | 69 | 4761 |
| 110 | 12100 | 94 | 8836 | 196 | 38416 |
| 133 | 17689 | 161 | 25921 | 153 | 23409 |
| 103 | 10609 | 124 | 15376 | 174 | 30276 |
| 111 | 12321 | 113 | 12769 | 147 | 21609 |
| 106 | 11236 | 133 | 17689 | 147 | 21609 |
| 87 | 7569 | 102 | 10404 | 135 | 18225 |
| 106 | 11236 | 124 | 15376 | 151 | 22801 |
| 143 | 20449 | 83 | 6889 | 101 | 10201 |
| 90 | 8100 | 138 | 19044 | 176 | 30976 |
| 146 | 21316 | 161 | 25921 | 82 | 6724 |
| 137 | 18769 | 143 | 20449 | 151 | 22801 |
| 129 | 16641 | 146 | 21316 | 148 | 21904 |

APPENDIX D

EXPERIMENTAL GROUP

MATH

GRADE EQUIVALENT SCORES

| x | $x^2$ | x | $x^2$ | x | $x^2$ |
|---|---|---|---|---|---|
| 84 | 7056 | 77 | 5929 | 48 | 2304 |
| 81 | 6561 | 57 | 3249 | 62 | 3844 |
| 66 | 4356 | 70 | 4900 | 84 | 7056 |
| 57 | 3249 | 62 | 3844 | 98 | 9604 |
| 69 | 4761 | 79 | 6241 | 63 | 3969 |
| 69 | 4761 | 70 | 4900 | 85 | 7225 |
| 109 | 11881 | 90 | 8100 | 61 | 3721 |
| 87 | 7569 | 85 | 7225 | 82 | 6724 |
| 80 | 6400 | 103 | 10609 | 78 | 6084 |
| 73 | 5329 | 71 | 5041 | 72 | 5184 |
| 46 | 2116 | 83 | 6889 | 77 | 5929 |
| 94 | 8836 | 49 | 2401 | 87 | 7569 |
| 77 | 5929 | 67 | 4489 | 62 | 3844 |
| 87 | 7569 | 69 | 4761 | 77 | 5929 |
| 70 | 4900 | 83 | 6889 | 72 | 5184 |
| 82 | 6724 | 94 | 8836 | 73 | 5329 |
| 81 | 6561 | 86 | 7396 | 64 | 4096 |
| 71 | 5041 | 74 | 5476 | 68 | 4624 |
| 71 | 5041 | 57 | 3249 | 64 | 4096 |
| 63 | 3969 | 47 | 2209 | 72 | 5184 |
| 73 | 5329 | 68 | 4624 | 104 | 10816 |
| 72 | 5184 | 57 | 3249 | 63 | 3969 |
| 89 | 7921 | 76 | 5776 | 73 | 5329 |
| 83 | 6889 | 60 | 3600 | 51 | 2601 |
| 66 | 4356 | 86 | 7396 | 60 | 3600 |

APPENDIX D

EXPERIMENTAL GROUP

READING

GRADE EQUIVALENT SCORES

| $x$ | $x^2$ | $x$ | $x^2$ | $x$ | $x^2$ |
|---|---|---|---|---|---|
| 120 | 14400 | 141 | 19881 | 98 | 9604 |
| 91 | 8281 | 103 | 10609 | 110 | 12100 |
| 156 | 24336 | 88 | 7744 | 103 | 10609 |
| 132 | 17424 | 118 | 13924 | 82 | 6724 |
| 93 | 8649 | 81 | 6561 | 115 | 13225 |
| 98 | 9604 | 120 | 14400 | 148 | 21904 |
| 99 | 9801 | 82 | 6724 | 77 | 5929 |
| 125 | 15625 | 133 | 17689 | 82 | 6724 |
| 99 | 9801 | 80 | 6400 | 90 | 8100 |
| 145 | 21025 | 145 | 21025 | 107 | 11449 |
| 125 | 15625 | 101 | 10201 | 89 | 7921 |
| 88 | 7744 | 127 | 16129 | 100 | 10000 |
| 140 | 19600 | 111 | 12321 | 146 | 21316 |
| 75 | 5625 | 128 | 16384 | 136 | 18496 |
| 176 | 30976 | 95 | 9025 | 151 | 22801 |
| 97 | 9409 | 142 | 20164 | 113 | 12769 |
| 73 | 5329 | 67 | 4489 | 146 | 21316 |
| 93 | 8649 | 129 | 16641 | 100 | 10000 |
| 103 | 10609 | 107 | 11449 | 107 | 11449 |
| 120 | 14400 | 65 | 4225 | 123 | 15129 |
| 128 | 16384 | 136 | 18496 | 115 | 13225 |
| 89 | 7921 | 107 | 11449 | 130 | 16900 |
| 123 | 15129 | 126 | 15876 | 98 | 9604 |
| 85 | 7225 | 89 | 7921 | 114 | 12996 |
| 135 | 18225 | 86 | 7396 | 80 | 6400 |

APPENDIX E

MOTOR FACILITATION
SURVEY

Name_____

Score_____

Key:
3=good
2=average
1=poor
0=cannot perform

1st Test

1. _____ Left and Right
2. _____ Body Image
3. _____ Imitation of Movement
4. _____ Kraus - Weber
5. _____ Angels-in-the-Snow
6. _____ Balance Board
7. _____ Right Foot
8. _____ Left Foot
9. _____ Running
10. _____ Jumping
11. _____ Hopping
12. _____ Skipping
13. _____ Ball Bouncing
14. _____ General Coordination

2nd Test

1. _____ Left and Right
2. _____ Body Image
3. _____ Imitation of Movement
4. _____ Kraus - Weber
5. _____ Angels-in-the-Snow
6. _____ Balance Board
7. _____ Right Foot
8. _____ Left Foot
9. _____ Running
10. _____ Jumping
11. _____ Hopping
12. _____ Skipping
13. _____ Ball Bouncing
14. _____ General Coordination

Note: This test was developed by the school district.

APPENDIX F

# SPEECH CORRECTION REPORT

Date_____

Name_____ School_____

Sex_____ Age_____ Grade_____ Teacher_____

Parent's Name_____ Address_____

Phone_____

Key: Substitutions are marked with sound substitued; distorted sound = dist; Ommissions = -; additions = -.

1. sun bicycle bus
2. spoon star squirrel
3. zipper scissors hose
4. thumb toothbrush teeth
5. three feather wreath
6. record carrot car
7. yellow house white tree ice cream drum
8. lamb ballon ball
9. airplane clock glasses
10. jack-in-box magician orange
11. chair matches watch
12. shoe flashlight fish
13. kite chicken snake
14. goat tiger pig
15. fork elephant knife
16. vaccum cleaner envelope stove

I. Other sound deviations noted:

2. Intelligibility of connected speech:

3. Voice:
   Quality:
   Loudness:
   Pitch:

4. Fluency:

5. Rate:

## Parent Contact

| Date | By | Remarks |
|---|---|---|
| | | |
| | | |
| | | |

## Oral examination

Lip mobility_____
Tongue mobility_____
Teeth_____
Soft Palate_____
Hard Palate_____
Nasal anomalies_____
Remarks_____

Diag:_____

Correct:_____

Note: This test was developed by the school district.

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